

REMARKS

Reconsideration and withdrawal of the rejections in the Office Action are respectfully requested in view of the following remarks.

Summary of Office Action

(1) Claims 1, 3, and 4 are rejected under 35 U.S.C. § 103(a) as being unpatentable over EP 597,129 ("FUJISAWA").

The Office Action alleges that FUJISAWA teaches substantially all the recitations of the claimed invention except that it does not disclose "Cr exceeding 60 wt.%" Instead, FUJISAWA teaches an alloy with Cr up to 60%. The Office Action insists, however, that the claimed content of Cr would have been obvious because FUJISAWA's up to 60 wt% is "close enough" to the claimed exceeding 60 wt% that it would be expected to have the same properties.

(2) Claims 1-6 are rejected under 35 U.S.C. §103(a) as being unpatentable over JP 07-278718 ("SHIDA") in view of JP 08-225899 ("ABIKO").

The Office Action alleges that SHIDA teaches an alloy with at least 70% Cr with reduced N and O impurities. However, the Office Action admits that SHIDA does not disclose C+N to be less than 20 ppm, S to be less than 20 ppm, O to be less than 100 ppm, and O as oxides to be less than 50 ppm. The Office Action then cites a secondary document, ABIKO, and alleges that ABIKO teaches a method of making an alloy that

P21273.A05

produces low amounts of impurities and has examples of alloy with C, N, S, and O in total amounts of 9.1 ppm, 15.0 ppm and 18.5 ppm. Therefore, the Office Action concludes that it would have been obvious to apply ABIKO's amounts in SHIDA's alloy because the reduced Cgi (defined as total quantity of C, N, S, and O) improves the workability of the alloy.

Response to Rejections

With respect to the rejection of claims 1, 3, 4 as being obvious over FUJISAWA, Applicants respectfully traverse the rejection and submit that there is no motivation to change FUJISAWA's Cr content to exceed 60 wt% in FUJISAWA. In fact, if anything, FUJISAWA's invention clearly and expressly teaches away from a composition "exceeding 60 wt.%" On page 16, line 1, FUJISAWA states that "addition of the Cr in excess of 60% by weight is undesirable in view of an increased cost." (emphasis added) Also, on Page 10, lines 45-48, FUJISAWA states that "Cr content in excess of 60% by weight will result in an insufficient workability even when the content of C, N, O, P and S is reduced." (emphasis added) On page 11, lines 21-24, FUJISAWA states that "the alloy having the Cr content within such a range (5-60%) would exhibit a sufficient acid resistance. Addition of an excessive amount of the Cr would result in poor workability. In addition, such an excessive addition of the Cr would not contribute to further improvement in the acid resistance." (emphasis added) Similar statements with regard to "sufficient

P21273.A05

oxidation resistance” is also provided on page 12, lines 26-30.

On the contrary, the presently claimed invention provides an alloy with an excellent strength-ductility balance at higher temperature. This is clearly and unambiguously demonstrated by experimental data of record. In Table 2 of the present specification, when Cr exceeds 60 wt.%, there are substantial increases in the alloy’s TS and RAXTS values, especially at higher temperatures. In FUJISAWA, however, excellent workability and strength at high-temperature is achieved by having Cr at 3 to 60% by weight and no more than 100 ppm in total content of C, N, O, P and S and only with at least one other element selected from Ti, Nb, Zr, V, Ta, W and B (page 5, lines 35-36).

Therefore, one of ordinary skill in the art will not be motivated to arrive at a Cr level of exceeding 60 wt% using FUJISAWA’s alloy (in view of this fact and in view of the express guidance to avoid exceeding 60 wt.% of Cr) and the rejection based on FUJISAWA is improper and should be withdrawn.

Moreover, high temperature strength in FUJISAWA’s invention merely means, as described on page 15, line 52 of its specification, proof stress at a temperature of 900°C, but not high temperature strength at a super-high temperature of more than 1000°C.

Further, FUJISAWA’s invention makes Cr 3-60 wt% and the total of C, N, O, P and S not more than 100 ppm, and adds at least one alloy element selected from Ti, Nb, Zr, V, Ta, W and B. That is, it appears to be a technique of limiting Cr to not more than 60 wt%

P21273.A05

and obtaining strength at a high temperature by adding other elements instead, so that FUJISAWA's invention is fundamentally different from the present invention for obtaining strength at a high temperature by adding Cr in excess of 60 wt%.

Even further, FUJISAWA's invention excludes addition of Cr in excess of 60 wt%, and further never refers to strength-ductility balance, at an ultra-high temperature of not less than 1000°C as disclosed in the present invention. Therefore, it is impossible to easily conceive that Fe-Cr alloy having not more than 60 wt% of Cr has the same characteristics as that having Cr in excess of 60 wt% as in the present invention, and even those skilled in the art cannot infer the excellent high temperature strength characteristics at a super-high temperature of not less than 1000°C which is possessed by an Fe-Cr alloy having Cr in excess of 60 wt% as claimed in the present application.

With respect to rejection of claims 1-6 over SHIDA in view of ABIKO, Applicants respectfully submit that the combination of these two documents is improper.

Regarding SHIDA, as the Office Action correctly recognizes, SHIDA teaches an alloy that contains more than 60% by weight of Cr. But the other elements of the alloy are more than an order of magnitude higher than what are claimed in the present invention. For instance, SHIDA's alloy could contain more than 1000 ppm of N and more than 900 ppm of O. On the contrary, the present claims require C+N of not more than 20 ppm. (In this regard, Applicants note that SHIDA's alloy is not even close, and Applicants expressly

P21273.A05

reserve the right to a scope of equivalents which extends to values close to those claimed.)

The difference is due to the different purposes of the two products. While SHIDA teaches an alloy to be cast into a product, the present invention provides an alloy which can be plastically worked after casting and made into a product. Moreover, there is no disclosure or suggestion that excellent strength at a high temperature is achieved by decreasing C, N, S, and O to an extremely small amount as compared to the amounts used in the alloy of SHIDA.

Regarding ABIKO, it teaches the use of smaller amounts of C, N, S, and O and a Cr amount of less than 60%. Its alloy has excellent plastic deformability in a temperature range of recrystallization temperature or below. However, ABIKO expressly teaches away the use of Cr to more than 60%. In Paragraph 0018¹, ABIKO states that "the effect is saturated and becomes disadvantageous economically, even if it adds exceeding 60 wt %, although it is necessary to add 15 wt% Cr at least in order to maintain the oxidation resistance as high temperature material." Thus ABIKO is completely deficient in establishing the obviousness of the present invention.

Moreover, as the Examiner is well aware, in order to combine two prior documents to reach all recitations of the claimed invention, there must be some suggestion or motivation for such combination. This is particularly important in this application since an

¹ This and the following quotations of ABIKO are based on information supplied to the undersigned by way of what are believed to be translations of the Japanese language ABIKO document.

P21273.A05

alloy, by its definition, is a combination of various elements. As the Federal Circuit recently stated:

“Virtually all inventions are combinations of old elements. Therefore, an examiner may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue. Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention.” *In re Rouffet*, 47 USPQ2d 1453, 1457 (Fed Cir 1998).

In this application, Applicants respectfully submit that one of ordinary skill in the art would not be motivated to either 1) reduce the amounts of C, N, S, and O in SHIDA to levels of in ABIKO's product because reducing in such a large amount would produce a product completely different from the teachings of SHIDA, 2) increase the amount of Cr in ABIKO to levels of SHIDA because ABIKO expressly teaches away from such increase. Therefore, the combination of the two documents is improper and the rejection which based on such combination should be withdrawn.

Furthermore, with respect to SHIDA and ABIKO, Applicants respectfully point out the following:

SHIDA's invention relates to a product which does not require workability after casting; therefore, there is no necessity of either high purification by decreasing C + N, S

P21273.A05

and O as gas components in alloy to ultra-micro amount or improvement of workability. In its Example, N is not less than 1185 ppm and O is 956 ppm, which contents are quite different from those of the present invention and far different from high purification. Therefore, there is no desirability of combining SHIDA's invention with ABIKO's invention.

The Office Action states that the present invention does not claim any processed product. However, present claims recite "A Cr-based alloy having an excellent strength-ductility balance at high temperature." Therefore, workability is clearly required. Further, the Office Action states that SHIDA's invention defines that N and O are not more than 2000 ppm and includes claims of the present invention. However, SHIDA's invention does not disclose or suggest that C+N should be not more than 20 mass ppm and O not more than 100 mass ppm and the necessity of decreasing the respective values to at least these levels, and these contents disclosed in Example are greater amounts as described above.

Moreover, ABIKO's invention discloses a technique of decreasing C+N, S and O as gas components to ultra-micro amount. However, ABIKO discloses metal having excellent deformability at a temperature of not more than recrystallization temperature (not more than 900°C according to the specification), but does not disclose the Fe-Cr alloy having excellent workability and strength-ductility balance at super-high temperature of not

P21273.A05

less than 1000°C that is the subject of the present invention.

Further, ABIKO limits the range of Cr to not more than 60 wt%, and describes in an Example of up to 50 wt%. Regarding this, the Office Action states that the reasons why Cr is limited to 60 wt% in ABIKO are merely economic. However, ABIKO describes in paragraph 0018 that “because the effect is saturated and becomes disadvantageous economically, even if it adds exceeding 60wt%” ABIKO thus states that the addition of not less than 60 wt. % Cr does not result in improvement of characteristics, i.e., the addition of Cr in excess of 60 wt% is economically disadvantageous. Therefore, ABIKO limits Cr to not more than 60 wt% viewed from characteristics.

Further, ABIKO also describes in paragraph 0018 of its specification that “in order to increase strength at a high temperature, it is extremely effective to add substitutional solid-solute reinforced elements such as Mo, W, Nb, Ta and Zr.” The description shows that improvement of high temperature strength is conducted not by adding not less than 60wt% of Cr but adding substitutional solid-solute reinforced elements. Therefore, ABIKO’s invention and the present invention for aiming at improvement of high temperature strength by adding Cr in excess of 60 wt.% are fundamentally different from each other in technical respects.

As explained above, ABIKO’s invention does not disclose nor suggests but simply denies addition of Cr in excess of 60 mass %. Further, the subject of ABIKO’s invention

P21273.A05

lies in improvement of workability at not more than 900°C, and does not aim to improve workability at a super-high temperature of not less than 1000°C.

Therefore, even if ABIKO's invention which does not have any technical idea of adding Cr in excess of 60 mass% and any subject recognition of improving workability at super-high temperature of not less than 1000°C is combined with SHIDA which does not require any necessity of improving workability, it is impossible to conceive the present invention by those skilled in the art.

CONCLUSION

In view of the foregoing, it is believed that all of the claims in this application are in condition for allowance, which action is respectfully requested. If any issues yet remain which can be resolved by a telephone conference, the Examiner is respectfully invited to telephone the undersigned at the telephone number below.

Respectfully submitted,
Kenji ABIKO

Bruce H. Bernstein
Reg. No. 29,027

August 4, 2003
GREENBLUM & BERNSTEIN, P.L.C.
1941 Roland Clarke Place
Reston, VA 20191
(703) 716-1191